Assembly and Operating Instructions
DPS Dual Port Serial Interface

Introduction

The DPS Dual Port Serial card is designed to interface standard RS-232 Terminals and Modems to computer systems using the SS-50 bus. The DPS card may be installed in any of the 30-pin I/O slots on the SS-50 bus. It may be configured to operate in systems that use either 4 or 16 addresses per I/O slot. Separate connectors are provided for terminals and modems. Terminals are connected to the TERM connector. Modems are connected to the MODEM connector. Baud rates between 110 and 9600 baud may be selected by means of separate jumpers for each port. The interrupt request lines for each port may be individually jumpered to the IRQ or FIRQ/NMI bus line.

Card Assembly

The following order of assembly is recommended. The components are all installed on the TOP side of the board and soldered on the BOTTOM side. Before starting assembly the bare board should be carefully inspected for shorts and opens.

1. Insert and solder all resistors.

2. Insert and solder all capacitors. Make sure the tantalum capacitors are inserted with the correct orientation.

3. Insert and solder 14-pin DIP sockets for U1 and U2. Insert and solder 16-pin DIP sockets for the TERM and MODEM connectors along the top edge of the board. Pin 1 of the DIP sockets should be next to the dot on the board.

4. Insert and solder the 10x2 header strip for baud rate selection and the 4x2 header for interupt selection.

5. Insert and solder the 10-pin Molex connectors along the bottom edge of the board. Insert the key at the position marked with a triangle.

6. Insert and solder voltage regulators U8,U9 and U10. Note the proper orientation of U9 and U10 as indicated on the parts overlay.

7. Plug the board into an I/O slot of a SS-50 computer and measure the voltages at the following points. If they are not as indicated find out why and correct the problem before proceeding.

U6 Pin 14	should be	+5 volts
U7 Pin 14	should be	+12 volts
U7 Pin 1	should be	-12 volts

8. Insert and solder U3,U4,U5,U6 and U7. Note that Pin 1 should be inserted next to the dot.

9. Install a 74LS02 in socket U1 or U2 to select the desired addressing option. Install the desired baud rate and interrupt option jumpers and the board is ready for operation.

Cable Assembly

The DPS board is designed to use cables built from standard flat cable and mass termination connectors. The DPS end of the cable uses a 16-pin mass termination DIP plug. The terminal or modem end uses a mass termination DB-25 type connector. The DB-25 may be either male or female as required by the installation. The 16-pin DIP plug must be of the type that has pin 16 connected to the number 1 conductor at the edge of the flat cable. To construct a cable proceed as follows.

1. Cut a piece of 16 conductor flat cable to the required length and press a 16 pin DIP plug on one end with pin 16 connected to the number 1 conductor of the flat cable.

2. Press a DB-25 connector on the other end of the flat cable with pin 1 connected to the number 1 conductor of the flat cable. Pins 9-13 and 22-25 of the DB-25 connector will not have any connection to the flat cable.

3. Verify that the cable has been constructed so that pin 16 of the DIP plug is connected to pin 1 of the DB-25 connector, cut this conductor near the DIP plug and crimp a lug on the end of the conductor that connects to pin 1 Of the DB-25. When the cable is installed this lug must be connected to the computer chassis. Failure to make this connection may result in a shock hazard or improper operation.

Connection to a Terminal

Construct a cable following the directions under the section "Cable Assembly". Plug the DIP connector into the TERM A or TERM B connector on the DPS board and connect the lug to the computer chassis. The DB-25 connector may be connected directly to the terminal or it may be mounted on the back of the computer and connected to the terminal with a straight through extension cable. The TERM connectors are wired so that the CTS,DCD and DSR leads are always "ON". The RTS and DTR leads are ignored by the DPS card. This provides compatibility with standard terminals and eliminates the need to program the ACIA control leads when a terminal is connected.

Connection to a Modem

Construct a cable following the directions under the section "Cable Assembly". Plug the DIP connector into the MODEM A or MODEM B connector on the DPS board and connect the lug to the computer chassis. Do not use the corresponding TERM and MODEM connectors at the same time. The DB-25 connector may be connected directly to the modem or it may be mounted on the back of the computer and connected to the modem with a straight through extension cable. The MODEM connectors are wired so the DTR lead is controlled by the ACIA "RTS" output and and RTS lead is always "ON". The CTS and DCD leads are connected to the corresponding inputs on the ACIA. The DSR and RI leads are ignored by the DPS card. Refer to your modem instructions for the proper programing of these leads. Remember that the DTR lead is controlled by the ACIA "RTS" output.

Connector Pinouts

DB-25 connector	function name	DIP connector	MODEM direction	TERM direction
1	Chassis Ground	N.C.	N.C.	N.C.
2	TXD	15	Output	Input
3	RXD	14	Input	Output
4	RTS	13	Output-ON	N.C.
5	CTS	12	Input	Output-ON
6	DSR	11	N.C.	Output-ON
7	Signal Ground	10	Sig. Gnd.	Sig. Gnd.
8	DCD	9	Input	Output-ON
20	DTR	7	Output	N.C.

Addressing

The DPS board is configured for 4 or 16 addresses per I/O slot by installing the 74LS02 IC in the U1 socket for 4 addresses per slot or in socket U2 for 16 addresses per I/O slot. There must never be an IC in both sockets at once.

Port Address Table

This table gives the A and B port addresses for each I/O slot. Addresses are given for both 4 and 16 addresses per I/O slot. A standard 6809 system is assumed, the hi-byte of the address will be different for other systems.

I/O	4 address I/O slots		16 address I/O slots	
slot	PORT A	PORT B	PORT A	PORT B
0	E000	E002	E000	E004
1	E004	E006	E010	E014
2	E008	E00A	E020	E024
3	E00C	E00E	E030	E034
4	E010	E012	E040	E044
5	E014	E016	E050	E054
6	E018	E01A	E060	E064
7	E01C	E01E	E070	E074

SWTBUG(tm) Problems

The SWTBUG(tm) monitor will not operate properly if a DPS board is used for the control port. The DPS board may be modified to operate as the SWTBUG(tm) control port as follows. If the system is using 4 addresses per I/O slot build a 14 pin DIP header with pins 1,10 and 14 connected and with pins 7 and 13 connected. Install this DIP header in socket U1 replacing the 74LS02. The DPS board should be in I/O slot 1 and the terminal should be connected to the TERM A connector. Port B will not work when this modification is installed.

If the system uses 16 addresses per I/O slot remove the 74LS02 from socket U2 and bend pin 8 out straight. Then solder a wire between pins 7 and 8 across the top of the 74LS02 and reinsert it in socket U2. The DPS board should be in I/O slot 0 and the terminal should be connected to the TERM B connector. Port A will work after this modification.

SWTBUG is a trademark of Southwest Technical Products Corporation

Parts List
Dual Port Serial Interface

Resistors

R1,R2,R3,R4	3.9K ohm 1/4 watt resistor
R5,R6,R7,R8	3.9K ohm 1/4 watt resistor
R9,R10,R11,R12	5.6K ohm 1/4 watt resistor

Capacitors

C1,C2,C3,C4,C5,C6	470 pfd disc capacitor
C7,C8,C9,C10	330 pfd disc capacitor
C11,C12,C13,C14,C18	0.047 mfd disc capacitor
C15,C16,C17	2.2 mfd 25 volt tantalum capacitor

Integrated Circuits

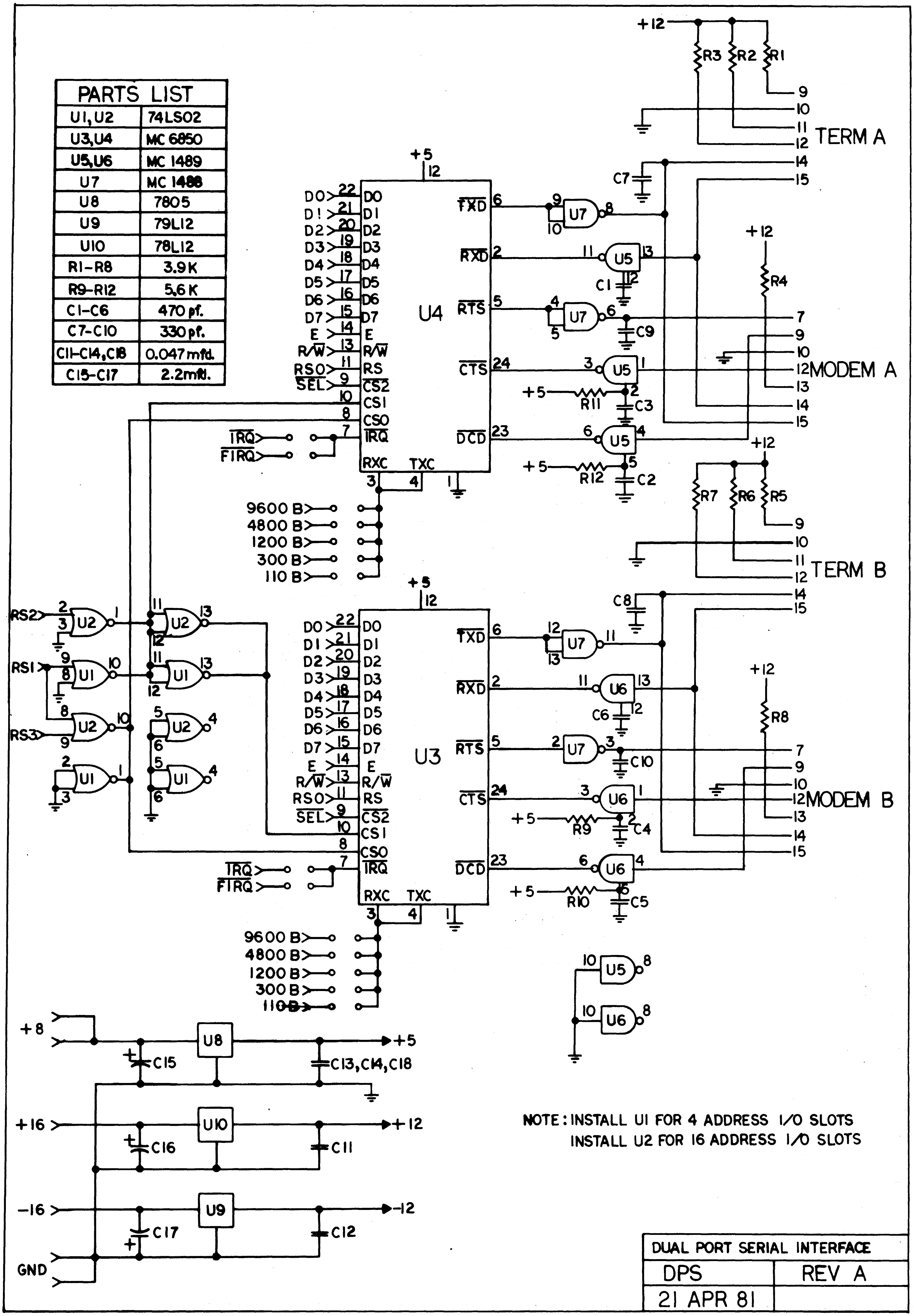
U1,U2	74LS02 quad NOR gate
U3,U4	MC6850 ACIA
U5,U6	MC1489 quad RS-232 receiver
U7	MC1488 quad RS-232 transmitter
U8	7805 +5 volt regulator
U9	79L12 -12 volt regulator
U10	78L12 +12 volt regulator

Miscellaneous

Qty. 3	10-pin female Molex connector
Qty. 1	Molex key
Qty. 4	16-pin DIP socket
Qty. 2	14-pin DIP socket
Qty. 1	10x2 header strip
Qty. 1	4x2 header strip
Qty. 4	jumper plugs
Qty. 1	4-40 x 1/4 screw
Qty. 1	4-40 nut

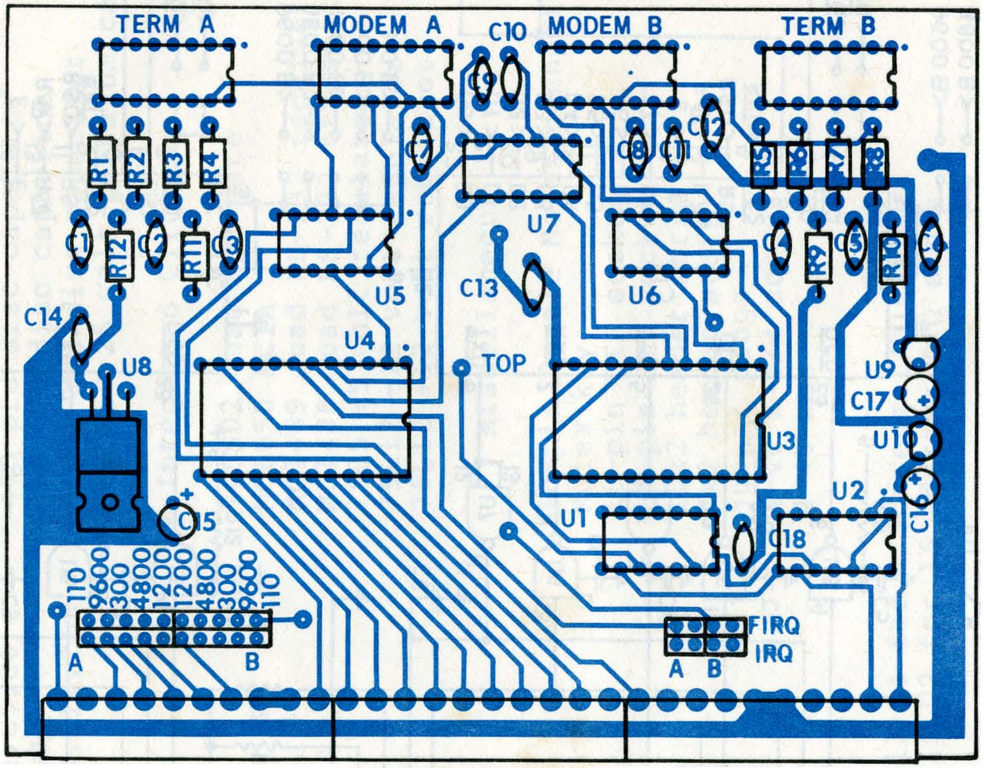
NOTE: Install U1 for 4 address I/O slots.
Install U2 for 16 address I/O slots.

PARTS LIST	
U1, U2	74LS02
U3, U4	MC 6850
U5, U6	MC 1489
U7	MC 1488
U8	7805
U9	79L12
U10	78L12
R1–R8	3.9 K
R9–R12	5.6 K
C1–C6	470 pf.
C7–C10	330 pf.
C11–C14, C18	0.047 mfd.
C15–C17	2.2 mfd.



NOTE: INSTALL U1 FOR 4 ADDRESS I/O SLOTS
INSTALL U2 FOR 16 ADDRESS I/O SLOTS

DUAL PORT SERIAL INTERFACE	
DPS	REV A
21 APR 81	



COMPONENT SIDE

DUAL PORT SERIAL INTERFACE

DPS	REV A
21 APR 81	